

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amtd. dated May 16, 2003
Reply to Office action December 19, 2002

REMARKS

As a result of this Amendment, claims 1-21 are under active consideration in the subject patent application. A Petition for Extension of Time was filed on March 13, 2003, extending the time for response from March 19, 2003, to April 19, 2003. A second PETITION FOR EXTENSION OF TIME has been filed, concurrently with this Amendment, extending the time for response to the Official Action (2) month, i.e., from March 19, 2003, to May 19, 2003.

In the Official Action, the Examiner has:

- (1) objected to the drawings under 37 CFR 1.83(a) and required corrected drawings;
- (2) rejected claims 1-2, 5-7, 11-13, 17 and 21, under 35 U.S.C. 102(b) in view of U.S. Patent No. 5,432,677, issued to Mowatt et al.;
- (3) rejected claim 3 under 35 U.S.C. 103 in view of U.S. Patent No. 5,432,677, issued to Mowatt et al.;
- (4) rejected claim 4 under 35 U.S.C. 103 over the combination of U.S. Patent No. 5,432,677, issued to Mowatt et al., with U.S. Patent No. 5,665,473, issued to Okoshi et al.;
- (5) rejected claims 8-10, 14-16 and 18-20 under 35 U.S.C. 103 over the combination of U.S. Patent No. 5,432,677, issued to Mowatt et al., with U.S. Patent No. 5,665,473, issued to Okoshi et al.;

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

(6) rejected claims 22-23 under 35 U.S.C. 103 over the combination of U.S. Patent No. 5,432,677, issued to Mowatt et al., with U.S. Patent No. 5,665,473, issued to Okoshi et al.;

(7) identified prior art made of record and not relied upon but considered pertinent to Applicants' disclosure.

With regard to Item 1, attached to this Amendment is a proposed corrected Figure 2, including the legend -- Prior Art -- as required by the Examiner. In particular, the legend -- Prior Art -- has been placed between parentheses and below the identifier "Fig. 2." No new matter is introduced into the Application as a result of this change to Fig. 2. Reconsideration of the Examiner's objection to Fig. 2, and introduction of new Fig. 2 into the application are requested.

With regard to Item 2, Applicants traverse the Examiner's rejection of claims 1-2, 5-7, 11-13, 17 and 21, in view of U.S. Patent No. 5,432,677 (the "Mowatt reference") and request reconsideration and withdrawal of this rejection for the following reasons.

Independent claims 1, 11, and 17 have been amended so as to better distinguish them from the prior art relied upon by the Examiner. Those changes to the claims are fully supported by the specification, drawings, and claims as originally filed. Dependent claims 2-10, 12-16, and 18-21 have been amended so as to bring them into conformance with their respective amended independent claim. No new matter is introduced into the Application as a result of these

Appl. No.: 10/055,771
Docket No.: H2022-00012
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

changes to the claims, which render all of the claims allowable over the Mowatt and Okoshi references, whether taken alone or in any valid combination.

Applicants have claimed a heat spreading interposer having at least one flexible electrical contact supported by a housing such that a first end of the at least one flexible electrical contact projects outwardly from a first side of the housing and a second end of the at least one flexible electrical contact projects outwardly from a second side of the housing. The claims have been amended to clarify that Applicants are providing an interposer which typically comprises an array of contacts supported in a housing so as to protrude from the top and bottom surfaces. In this way, the interposer may be placed between an active component, e.g., an integrated circuit chip, and a substrate, e.g., a printed wiring board.

Applicants' interposer provides electrical connection between correspondingly positioned contact pads by use of flexible, compressible conductive buttons that are appropriately located in holes in an insulating housing. Claims 1, 11, and 17 have been amended to further clarify this aspect of the invention. The housing comprises a lamination having at least one layer of thermally conductive material supported by at least one layer of a dielectric material so that a portion of the at least one flexible electrical contact is (i) engaged, and (ii) in thermal communication with the at least one layer of thermally conductive material. This structure is simply absent from the prior art relied upon by the Examiner.

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

Anticipation under 35 U.S.C. §102 requires that each and every element of the invention defined in the claim be met in a single prior art reference. Those elements must either be inherent or disclosed expressly, and must be arranged as described in the claim. See, Diversitech Corporation v. Century Steps, Inc., 850 F.2d 675, 7 U.S.P.C.I.2d 1315 (Fed. Circuit 1988), Constant v. Advanced Micro-Devices, Inc., 848 F.2d 1560, 7 U.S.P.Q.2d 1057 (Fed. Circuit 1988), and Richardson v. Suzuki Motor Company, 868 F.2d 1226, 9 U.S.P.Q.2d 913 (Fed. Circuit 1989).

Nowhere within the four corners of Mowatt et al., is there disclosure or even a vague suggestion of an interposer having at least one flexible electrical contact supported by a housing such that a first end of the flexible electrical contact projects outwardly from a first side of the housing and a second end of the flexible electrical contact projects outwardly from a second side of the housing. More particularly, Mowatt discloses a multi-chip integrated circuit package having upper and lower surfaces fabricated from a polymer material. The substrate has a lower conductive surface disposed on a lower side and a plurality of cavities, i.e., through-holes, formed in the upper surface of the substrate for receiving an integrated circuit chip's lead contacts. In other words, Mowatt provides a form of "chip socket." "Via" openings are arranged such that they expose bonding pads and conductive pads. A pattern of interconnect conductors is disposed on the top of the laminate film so as to extend between at

Appl. No.: 10/055,771
Docket No.: H2022-00012
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

least some of the "via" openings and thereby provide electrical connections between select ones of the bonding pads and the conductive pads.

Significantly, Mowatt does not disclose, or for that matter have any need for, a flexible and compressible electrical contact, that stands proud of both sides of his substrate, since his "via's" and through-hole cavities act as receptacles for receiving integrated circuit lead contacts. Furthermore, Mowatt utterly fails to teach, in any way, that a portion of at least one flexible electrical contact is engaged with and in thermal communication with the at least one layer of thermally conductive material, as defined in amended independent claims 1, 11 and 17. In fact, he teaches away from such an arrangement. At col. 5, line 54 through col. 6, line 4, Mowatt teaches:

"...The plated-through holes are formed by first drilling holes through selected regions of the upper surface of the copper layer 12 and downward through the laminate layer 10, the copper layer 18, the laminate layer 16 and the copper layer 20. Note that these holes will have a conductive layer disposed on the sides thereof. ***Therefore, if the plating material that is disposed on the sidewalls of the holes were to contact the conductive layer 18, this would result in the conductive layer 18 being at the same potential as the conductive layer 20. This may be undesirable.*** Therefore, the conductive layer 18 would require patterning and etching in the initial board manufacturing process to define isolated regions through which the plated-through holes can later be formed. Three regions 30, 32 and 34 are illustrated through which three holes 36, 38 and 40 are formed. . ." [emphasis added].

Thus, Mowatt clearly teaches that the conductive material defining his plated "through-holes" should not engage his thermally conductive layer (18).

Bur 2^o
in contact
with C18
Plated hole

Appl. No.: 10/055,771
Docket No.: H2022-000(2)
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

A prior art reference teaches away from an invention ". . . if it suggests that the line of development flowing from the reference disclosure is unlikely to produce the result sought by the Applicant . . ." In other words, ". . . doing what a prior art reference tries to avoid is the very antitheses of obviousness. . ." In re Braat, 918 F.2d 185, 16 U.S.P.Q.2d 1812, 1814 (C.A.F.C. 1990); In re Dow Chem. Co., 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1532 (C.A.F.C. 1988); Gambro Lundia AB v. Baxter Healthcare Corp., 110 F.3d 1573, 1579, 42 U.S.P.Q.2d 1378, 1383 (C.A.F.C. 1997); Baxter Int'l Inc. v. McGaw Inc., 149 F.3d 1321, 1328, 47 U.S.P.Q.2d 1225, 1230 (C.A.F.C. 1998); In re Gurley, 27 F.3d 551, 553, 31 U.S.P.Q.2d 1130, 1131 (C.A.F.C. 1994); and In re Buehler, 515 F.2d 1134, 1141, 185 U.S.P.Q. 781, 787 (C.C.P.A. 1975). Throughout Applicants' specification, drawings, and in each and every claim, Applicants' desire for a flexible electrical contact that engages with and is in thermal communication with at least one layer of thermally conductive material is manifest - a result that Mowatt clearly wishes to avoid.

These features of the present invention are neither inherent to the structure taught by Mowatt et al., nor are they disclosed expressly in that reference. Applicants' invention as defined by independent claims 1, 11, and 17 is not anticipated by the disclosure of Mowatt et al. Accordingly, amended independent claims 1, 11 and 17, are not anticipated by Mowatt et al. Claims 1, 11 and 17 are allowable

Appl. No.: 10/055,771
Docket No.: H2022-00012
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

Likewise, dependent claims 2, 5 – 7, 12 – 13 and 21 are all allowable at least through dependency from the foregoing amended independent claims. Reconsideration and withdrawal of the Examiner's rejection under 35 U.S.C. §102(b) is respectfully requested.

With regard to Item 3, Applicants request reconsideration and withdrawal of the rejection of claim 3 under 35 U.S.C. §103 for the following reasons. In order for a *prima facie case* of obviousness to be established, there must be some suggestion or motivation, either in the reference itself, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference must teach or suggest all of the claim limitations (MPEP §2142). Nowhere within the four corners of the Mowatt reference is there any teaching or suggestion, whatsoever, of a thermally conductive insulator as defined in amended claim 3. Moreover, Mowatt fails to disclose a flexible electrical contact that is engaged with and in thermal communication with at least one layer of thermal conductive material. Thus, Mowatt fails to provide the requisite suggestion or motivation to one of ordinary skill in the art. Accordingly, claim 3 is patentable, at least through dependency, from amended claim 1. Reconsideration is requested.

With regard to Item 4, the Examiner has proposed a combination of the Mowatt reference with U.S. Patent No. 5,665,473, issued to Okoshi et al. (the "Okoshi reference"). Applicants respectfully traverse the Examiner's combination of references and request reconsideration for the following reasons. As

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

discussed in detail hereinabove, Mowatt utterly fails to teach or suggest in any way a flexible electrical contact that is engaged with, and in thermal communication with, at least one layer of thermal conductive material in an interposer. Okoshi utterly fails to provide any of the foregoing structural deficiencies to Mowatt, and therefore fails to save the Examiner's combination. Applicants further respectfully submit that it is the invention as a whole, i.e., the structure, its properties, and the problem it solves, that must be considered in making a determination of obviousness. In re Shaffer, 108 USPQ 326, In re Wright, 6 USPQ2d 1959. Taken as a whole, the proposed combination of references suggests an integrated circuit chip socket that has holes (32) separating a thermally conductive layer (18) from a "via" housing a lead from the integrated circuit chip. Accordingly, claim 4 is allowable over the proposed combination of Mowatt and Okoshi, at least through dependency from amended independent claim 1.

With regard to Item 5, the Examiner has rejected claims 8 – 10, 14 – 16, and 18 – 20 over the same combination of the Mowatt and Okoshi references. Applicants respectfully traverse the Examiner's reliance upon this combination, and request reconsideration for the following reasons.

Here again, Okoshi utterly fails to disclose any of the missing teachings from Mowatt as detailed with regard to independent claim 1. Moreover, the Examiner admits that Mowatt fails to teach wings projecting outwardly from the housing and bonded to a conductive layer for the purpose of increasing heat

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amtd. dated May 16, 2003
Reply to Office action December 19, 2002

dissipating capacity. The Examiner attempts to combine unrelated structural features of Okoshi in making his combination. The Examiner has inaccurately characterized the structure and function of Okoshi's device.

More particularly, Okoshi discloses a package for mounting a semiconductor device having a base plate with a conductive layer laminated onto the base plate with an adhesive. The Examiner states that Okoshi shows thermally conductive layers with wings (24, 32 and 32[sic]) that the Examiner suggests are projecting from the outer edges of the layers and thus thermally bonded to the wings. This characterization of Okoshi is inconsistent with the specification of that reference. Okoshi's outer leads 24 and 32 are for the purpose of electrical interconnection to other devices and serve no thermal transfer or heat dissipating function. Thus, there is no requisite suggestion or motivation within Okoshi or Mowatt for at least one layer of thermal conductive material that a size larger than the housing so as to form at least one wing projecting outwardly from at least one edge of the housing so as to dissipate heat into the ambient environment. On the contrary, Okoshi's leads 24 and 32 would increase temperature, through electrical current traveling through them, rather than dissipating thermal energy that is transferred, via conduction, from Applicants' housing. Accordingly, Applicants' dependent claims 8 – 10, 14 – 16 and 18 – 20 are patentable in their own right over the combination of Mowatt and Okoshi, and are patentable at least through their dependency from independent claims 1 and 11, respectively. Reconsideration is requested.

Appl. No.: 10/055,771
Docket No.: H2022-000C2
Amdt. dated May 16, 2003
Reply to Office action Dec mber 19, 2002

With regard to Item 6, Applicants have cancelled claims 22 – 23 thus rendering their rejection in view of the combination of Mowatt and Okoshi moot.

With regard to Item 7, Applicants have reviewed the prior art made of record, but not relied upon by the Examiner. No valid combination of Mowatt or Okoshi with any of the foregoing identified prior art would anticipate or render obvious Applicants claimed invention.

Since nothing in the prior art references would lead a person of ordinary skill in the art to design an apparatus like that described in the application, or defined by claims 1-21, it appears that hindsight knowledge of the present invention is the only motivation to combine these references. Applicants respectfully submit that the motivation to combine references cannot come from the invention itself. See In re Oetiker, 24 U.S.P.Q. 2d 1443, 1446. It is improper to use the claims as a framework with individual parts of separate prior art references employed to recreate a facsimile of the claimed invention. See, W.L. Gore and Associates, Inc. v. Garlock, Inc. 220 U.S.P.Q. 303, 312. The Examiner is also referred to In re Bond, 910 F2d 831, 15 U.S.P.Q. 2d 1566 (Fed. Cir. 1990) which held that the PTO erred in rejecting a claimed invention as an obvious combination of the teachings of two prior art references when the prior art provided no teaching, suggestion, or incentive supporting the combination.

In summary, Applicants submit that the unique apparatus and method defined by claims 1-21 is not disclosed in the prior art references, taken as a whole, and there is no teaching or suggestion in the references to support their

Appl. No.: 10/055,771
Docket No.: H2022-00002
Amdt. dated May 16, 2003
Reply to Office action December 19, 2002

use in the particular claimed combination. In the absence of such, the references are improperly combined. In any event, claims 1-21 define over the combination of Mowatt and Okoshi.

In view of the foregoing, Applicants respectfully submit that claims 1-21 are in condition for allowance. Favorable reconsideration is therefore respectfully requested.

If a telephone conference would be of assistance in advancing prosecution of the above-identified application, Applicants' undersigned Attorney invites the Examiner to telephone him at 717-237-5516.

Respectfully submitted,

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Page 19 of 20

Appl. No.: 10/055,771
Docket No.: H2022-0000:
Amdt. dated May 16, 2003
Reply to Office action Dember 19, 2002
Drawing Replacement Sheet

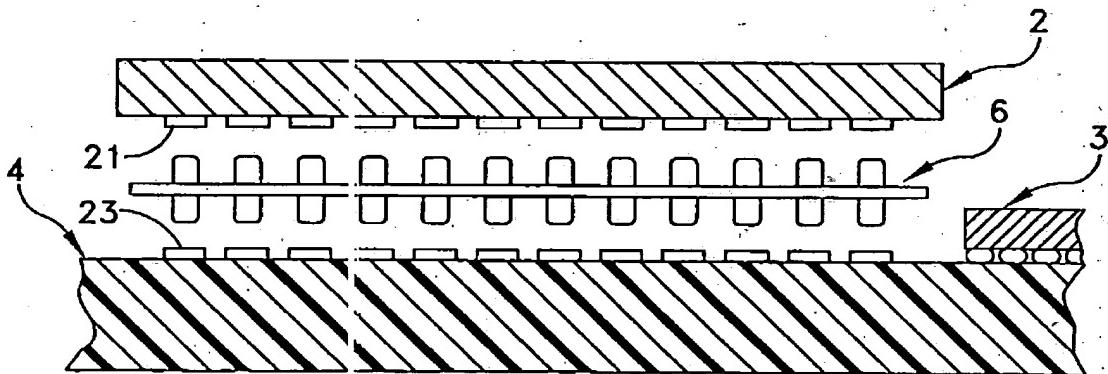


FIG. 1
(PRIOR ART)

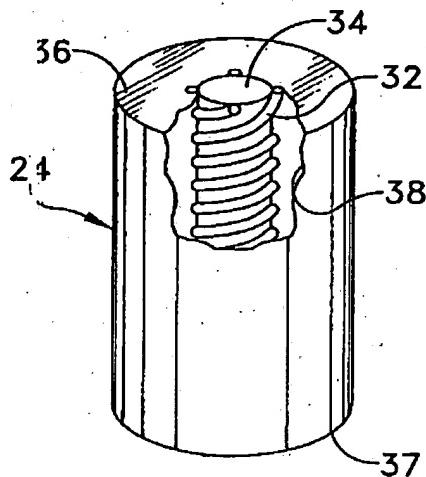


FIG. 2
(PRIOR ART)